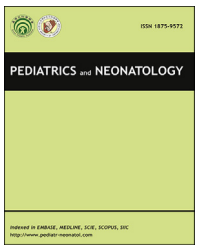
Pediatrics and Neonatology (2016) xx, 1–3

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.pediatr-neonatol.com



BRIEF COMMUNICATION

Acute Fatal Alcohol Intoxication in a 3-Day-Old Neonate

Chang-Teng Wu [b], Shao-Hsuan Hsia [b], Chyi-Liang Chen [c], Hao-Yuan Lee [a,d,*]

[a] *Department of Nursing, Jen-Teh Junior College of Medicine, Nursing and Management, Miaoli, Taiwan*
[b] *Division of Pediatric General Medicine and Critical Care Medicine, Chang Gung Children's Hospital, Graduate Institute of Clinical Medical Sciences, Chang Gung University College of Medicine, Taoyuan, Taiwan*
[c] *Molecular Infectious Disease Research Center, Department of Medical Research, Chang Gung Memorial Hospital, Taoyuan, Taiwan*
[d] *Department of Pediatrics, Wei-Gong Memorial Hospital, Miaoli, Taiwan*

Received Sep 25, 2015; received in revised form Nov 11, 2015; accepted Nov 27, 2015
Available online ■ ■ ■

1. Introduction

There are few reports on alcohol intoxication in infants, and associated death has never been reported. A literature search showed nine cases of alcohol intoxication involving infants < 12 months of age: two of these were iatrogenic and seven were accidental (Table 1).[1–7] We report the case of a 3-day-old male infant with alcohol intoxication due to child abuse, and include a review of the current literature. To the best of our knowledge, this neonate is the youngest child with ethanol intoxication, and this study is the first reported fatal case.

2. Case Presentation

This boy was born via normal spontaneous delivery in Min-Sheng General Hospital (Taoyuan, Taiwan) in 2015. He was taken home after 2 days and cared for only by his father, who had a history of domestic violence and was intoxicated with alcohol throughout the day. The father gave approximately 50 mL of rice wine to the infant instead of milk. When the father woke up from his binge the next day, he found that the neonate had general cyanosis and was not spontaneously breathing. He called for an emergency medical technician, and the baby was brought to our pediatric emergency room. On arrival, no heartbeat or respiration was found. Pulseless electrical activity was detected through an electrocardiogram. Cardiopulmonary–cerebral resuscitation (CPCR) with chest compression was performed, and then the neonate was intubated. There were no obvious signs of trauma.

After the patient was admitted to our pediatric intensive care unit, CPCR was continued with intermittent mandatory ventilation support. The blood gases revealed severe acidosis (pH = 6.5) and carbon dioxide retention. Sodium bicarbonate, epinephrine, and fluid challenge with normal saline were applied. CPCR was continued for 30 minutes; however, it failed and the patient died. Whole-body computed tomography and a long-bone survey revealed no obvious signs of fracture or internal bleeding. The cerebrospinal fluid collected via lumbar puncture was normal. An ophthalmologist found no obvious retinal detachment or hemorrhage. The blood alcohol concentration (BAC; 61 mg/dL) was elevated. We checked for other drugs, such as cocaine, amphetamine, acetaminophen, and diphenhydramine, but

* Corresponding author. Department of Nursing, Jen-Teh Junior College of Medicine, Nursing and Management, No. 79-9, Sha-Luen-Hu, Xi-Zhou Li, Hou-Loung Town, Miaoli County 35664, Taiwan.
E-mail address: d9700101@gmail.com (H.-Y. Lee).

http://dx.doi.org/10.1016/j.pedneo.2015.11.007

Please cite this article in press as: Wu C-T, et al., Acute Fatal Alcohol Intoxication in a 3-Day-Old Neonate, Pediatrics and Neonatology (2016), http://dx.doi.org/10.1016/j.pedneo.2015.11.007

Table 1 Comparison of all reported infants intoxicated with alcohol in the world by the sequence of their age.

Age	Sex	Country	BAC (mg/dL)	Symptoms and signs	Access of alcohol absorption	Treatment	Outcome	Reference
3 d	Boy	Taiwan	61	OHCA	Child abuse	CPCR and intubation	Death	This study
15 d	Girl	Japan	43	Flushed skin, tachycardia and low blood pressure, somnolence and metabolic acidosis	Giving formula milk that was accidentally diluted with sake (Japanese wine)	Intravenous fluid replacement	Recovery	Zaitsu et al[2]
15 d	Girl	France	440	Coma	Applying ethanol-soaked dressings to sterilize umbilical cord	Giving intravenous fluids with dextrose and intubation	Recovery	Autret et al[3]
29 d	Girl	USA	301	Strange behavior, inattentiveness, a weak cry, and hypotonia	Ingesting formula that had been prepared with gin.	Giving intravenous fluids with 5% dextrose	Recovery	Fong and Muller[4]
1 mo	Girl	Italy	362	Lethargy, hypotonia, tachycardia, tachypnea, and mildly hypotension	Using ethanol soaked gauze to promote umbilical cord detachment	Giving intravenous fluids	Recovery	Minera and Robinson[1]
1 mo	Boy	Italy	75	Torpor, tremors, slight fever	Giving white wine mixed in a milk formula	Giving intravenous fluids	Recovery	Palano et al[5]
9 wk	Boy	USA	330	Dazed eyes, tachycardia	Smelling of alcohol	Giving dextrose 5% and normal saline solution (D5NS)	Recovery	Minera and Robinson[1]
6 mo	Boy	USA	220	Coma, hypoglycemia, hypothermia, tachycardia, and tachypnea	Using ethanol on his trunk and extremities for a sponge bath	Giving 50% glucose in water intravenously	Recovery	Moss[6]
7 mo	Boy	USA	183	Tachycardia, tachypnea, and mild hypotension	Giving vodka mixed in a formula	Giving intravenous fluids	Recovery	Minera and Robinson[1]
9 mo	Girl	USA	524	Floppiness, unresponsiveness	Giving a bottle of formula mixed with vodka	Intubation and fluid resuscitation	Recovery	Edmunds et al[7]

CPCR = cardiopulmonary–cerebral resuscitation; OHCA = out-of-hospital cardiac arrest.

Please cite this article in press as: Wu C-T, et al., Acute Fatal Alcohol Intoxication in a 3-Day-Old Neonate, Pediatrics and Neonatology (2016), http://dx.doi.org/10.1016/j.pedneo.2015.11.007

the results were negative. High glutamate oxaloacetate transaminase (GOT) (3955 U/L), high glutamate pyruvate transaminase (GPT) (517 U/L), low glucose (48 mg/dL), high creatinine (1.11 mg/dL), and acidosis (pH = 6.543) values were found. A social worker was consulted regarding child abuse.

3. Discussion

We reviewed all reported cases of alcohol intoxication of infants worldwide (Table 1). Acute alcohol intoxication can be life threatening, and can result in coma, seizures, hypothermia, acidosis, or death with BAC values > 400 mg/dL.[1] The neonate's BAC value (61 mg/dL) was likely low owing to the delay from the time of consumption to resuscitation, while his father was intoxicated with alcohol and was unconscious. The clearance of alcohol follows zero- or first-order kinetics at an average rate of 21.6—49.7 mg/dL per hour.[1,7] We estimated that the delay from the time of intoxication to resuscitation exceeded 10 h; therefore, his highest predicted BAC was probably > 400 mg/dL.

Alcohol poisoning can occur in infants owing to accidental ingestion, child abuse, skin absorption from alcohol-containing materials, or by smelling alcohol (Table 1). In addition to drowsiness, infants with alcohol intoxication most commonly have lethargy, torpor, tremors, strange behavior, inattentiveness, weak cry, hypotonia, hypotension, and metabolic anomalies. Those symptoms are typical of classic acute alcohol intoxication, such as hypoglycemia, hypothermia, tachycardia, tachypnea, metabolic acidosis, and coma.

The mainstays of therapy are supportive care with dextrose-containing intravenous fluids and respiratory support including mechanical ventilation. Hemodialysis can speed alcohol clearance, but is generally reserved for severe cases of alcohol intoxication complicated by coma, acidosis, and hemodynamic instability.[7]

Prior to this case, the reported outcome of alcohol intoxication in infants was benign, with complete recovery without complications, even after resuscitation including intubation. This might mislead us to conclude that delaying the treatment of infants with alcohol intoxication causes little harm. This report demonstrates that delaying treatment in infants with alcohol intoxication may lead to death.

In conclusion, we report a case of acute alcohol intoxication in a 3-day-old infant due to child abuse, resulting in delayed treatment and death, in contrast to the full recovery reported in all nine other similar cases in infants. This case alerts us about the unfortunate outcome probably caused by acute alcohol intoxication in the infant; moreover, clinicians should be aware of the fatality of such cases. Therefore, it is very important to initiate immediate treatment in alcohol intoxication by performing hydration with dextrose-containing fluids and resuscitation. We also emphasize the importance of considering the risk of percutaneous or gastrointestinal alcohol absorption, particularly in young infants, and the need for toxicology screening in every child with drowsiness of unknown etiology.

Ethical statement

This study has been approved by the institutional review board of Chang Gung Memorial Hospital (IRB No. 102-0498B).

Conflicts of interest

All authors declare no conflict of interests.

References

1. Minera G, Robinson E. Accidental acute alcohol intoxication in infants: review and case report. *J Emerg Med* 2014;**47**:524—6.
2. Zaitsu M, Inada Y, Tashiro K, Hayashi C, Doi H, Hamasaki Y, et al. Acute alcohol intoxication in a 15-day-old neonate. *Pediatr Int* 2013;**55**:792—4.
3. Autret E, Sanyas P, Chantepie A, Gold F, Laugier J. Poisoning by externally-administered ethanol in an infant. *Arch Fr Pediatr* 1982;**39**:823—4 [Article in French].
4. Fong HF, Muller AA. An unexpected clinical course in a 29-day-old infant with ethanol exposure. *Pediatr Emerg Care* 2014;**30**:111—3.
5. Palano GM, Praticò AD, Praticò ER, D'Agata A, Carpinato C, Sottile F, et al. Accidental ethyl alcohol intoxication in a 30-day-old infant. Clinical findings and neurological follow-up. *Minerva Pediatr* 2007;**59**:275—9 [Article in Italian].
6. Moss MH. Alcohol-induced hypoglycemia and coma caused by alcohol sponging. *Pediatrics* 1970;**46**:445—7.
7. Edmunds SM, Ajizian SJ, Liguori A. Acute obtundation in a 9-month-old patient: ethanol ingestion. *Pediatr Emerg Care* 2014;**30**:739—41.

Please cite this article in press as: Wu C-T, et al., Acute Fatal Alcohol Intoxication in a 3-Day-Old Neonate, Pediatrics and Neonatology (2016), http://dx.doi.org/10.1016/j.pedneo.2015.11.007